

Claims:

1. A micropump with a pump membrane which can be moved by modifying the volume of a pump chamber which is adjacent to the pump membrane and a base part, also comprising two valves which are arranged in recesses in the base part and react to the pressure in the pump chamber in order to alternately open and close an inlet channel and an outlet channel for a medium to be pumped, characterized in that the valves are formed without any common components by standalone functioning valve modules comprising a valve seat and a valve body.
2. The micropump according to claim 1, characterized in that both valve modules are identically constructed.
3. The micropump according to claims 1 or 2, characterized in that hollows which are open toward the pump chamber are formed as recesses.
4. The micropump according to claim 3, characterized in that the height of the valve module is equal to the depth of the hollow receiving the module.
5. The micropump according to one of claims 1 to 4, characterized in that the valve module is made of two parts with a preferably rotationally symmetrical seat component, and a valve body preferably designed as a spring component for closing and opening of a preferably central opening in the seat component.

6. The micropump according to claim 5, characterized in that the spring component exhibits a film in which a lip element is formed through at least one cutout and attached at one end or at several ends with the remaining film.
7. The micropump according to claim 6, characterized in that the cutout is a slot cutout following the contour of the lip element.
8. The micropump according to claim 6 or 7, characterized in that the spring component is connected with the seat component in an outer ring area which is centered by the seat component, from which the lip element extends inwards.
9. The micropump according to claims 5 to 8, characterized in that the seat component exhibits a ring heightening in the area of the valve seat which extends from a floor plate and which prestresses the lip element in the resting state.
10. The micropump according to claim 9, characterized in that the seat component has an elevated rim seat by means which the lip element is lifted across its entire length from the floor plate.
11. The micropump according to one of claims 8 to 10, characterized in that the lip element is connected with the ring area at two diametrical places or connected with the ring area at three places which are evenly distributed across the ring area.

12. The micropump according to one of claims 1 to 11, characterized in that it is composed of a base module which receives the valve modules and comprises a base part and hose connections, and of a actuator module which includes the membrane and a piezo disk connected to the membrane.
13. The micropump according to claim 11, characterized in that the base module, with exception of the recesses, and/or the actuator module is rotationally symmetrical.
14. The micropump according to claims 1 to 13, characterized in that the base part is disk-shaped and that the inlet and outlet channel extend perpendicularly relative to the disk plane.
15. The micropump according to claim 13 or 14, characterized in that a seat for the actuator module is formed on the base part, and preferably the pump membrane rests over a support ring on a ring shoulder located on the base part.
16. The micropump according to one of the claims 13 to 15, characterized in that the base module is formed in one piece with the hose connections.
17. The micropump according to one of claims 1 to 15, characterized in that at least the part of the pump which comes into contact with the medium is made of a plastic.
18. The micropump according to one of claims 1 to 17, characterized in that the membrane is made of one piece or exhibits several layers of different material.

19. The micropump according to one of claims 1 to 18, characterized in that the membrane exhibits a recess facing the pump chamber, which preferably corresponds to the maximum pump chamber volume.
20. The micropump according to one of claims 1 to 18, characterized in that the membrane is cap-like and can be moved manually or the help of an actuation which is temporarily or permanently attached to the membrane.
21. A method for the serial production of micropumps according to one of the claims 1 to 20, characterized in that the valve modules, base modules, which include the base part and connections, as well as the actuator modules which include the membrane, are prefabricated independently of one another and wherein the micropump is made up of these modules.